



PROCESS SPECIFICATION

PROCESS SPECIFICATION NUMBER: ERA-1014

412 Auxiliary Fuel Tanks

FABRICATION AND INSTALLATION OF THE NON-SKID GRATING

PREPARED BY:

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 MESH PLASTICS LTD.

DATE: 1/26/87

APPROVALS

MANUFACTURING	QUALITY CONTROL	ENGINEERING	
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PROCESS SPECIFICATION

Scope: This specification outlines the requirements for fabricating and installing the non-skid grating for 412 Auxiliary Fuel Tanks.

Conformation: This specification does not conform to any existing government specification.

Subcontractors: MESH PLASTICS, LTD. of Lake Charles, Louisiana, or its subcontractor shall be the only subcontractors qualified to construct the FRP requirements and shall comply with this process specification. Any deviations or variations are to be submitted to ERA for approval with proper documentation prior to fabrication.

Conflicts: In the event of a conflict with engineering drawing(s) and this specification, the drawing(s) shall govern.

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Fabrication and installation of
the Non-Skid Grating for the
412 Auxiliary Fuel Tanks

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Rev	Date	Pages	Approvals					
			Manufacturing		Quality Control		Engineering	
			MESH	ERA	MESH	ERA	MESH	ERA
IR	1/26/87	ALL	<i>[Signature]</i>	<i>[Signature]</i>	<i>[Signature]</i>	<i>[Signature]</i>	<i>[Signature]</i>	<i>[Signature]</i>

MATERIALS

<u>MATERIAL</u>	<u>NAME</u>	<u>MANUFACTURER</u>
Resin	Derakane 8084	Dow Chemical Midland, MI
Promoter	Cobalt Napthenate	AKZO Chemie New Brunswick, NJ
Accelerator	Dimethylaniline	Buffalo Colors West Paterson, NJ
MEKP Catalyst	Hi Point 90	Witco Chemical Richmond, CA
	Lupersol DHD 9	Lucidol Chemical Buffalo, NY
Mold Release	PVA	Rexco Carpenteria, CA
	Cerea Mold Release Wax	Ceara Products, Inc. Denver, CO
UV Inhibitor	UV-9	Industrial Chemicals Atlanta, GA
Pigment	CoPlas pigment	CoPlas Ft. Smith, AR
	Spartan pigment	Spartan Pigments Houston, TX

MATERIALS

<u>MATERIAL</u>	<u>NAME</u>	<u>MANUFACTURER</u>
Putty filler (Amorphous Fumed Silica)	Aerosil	Dequssa Corp. Teterboro, NJ
	Cabosil	Cabot Corp. Boston, MA
Milled Fibers	731 ED	Owens-Corning Anderson, S.C.
Kevlar Woven Roving	K 49/051	Knytex Seguin, Tex.
	285-F100	Hexcell Chicago, Ill.
Inorganic Microspheres	Q-Cell 200	PQ Corp. Valley Forge, Pa.

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MATERIALS

<u>MATERIAL</u>	<u>NAME</u>	<u>MANUFACTURER</u>
Paraffinated Styrene	TF-100	Industrial Chemicals Atlanta, GA
Grinding Discs	36 Grit Type D 60 Grit Type C 80 Grit Type C	3M Corp. St. Paul, MN
Mold surface	Black Tooling Gel	Glidden
Wet/Dry Sandpaper	100 Grit 320 Grit 400 Grit 600 Grit	3 M Corp. St. Paul, Minn.

A. FABRICATION

- 1) Inspect molds for defects (ie. chips, cracks, crazing, etc.), do not proceed until any defect is corrected.
- 2) Apply mold release agent(s) according to manufacturers instructions to molds.
- 3) Apply a thin layer of paste made from 3 parts Derakane 8084 resin containing UV inhibitor and pigment, 1 part Q-Cell 200, and 1 part milled fibers.
- 4) Apply six strands of Kevlar roving in grooves of the mold. Saturate with same paste used in Step 3.
- 5) Fill the remaining voids in the mold with paste.
- 6) Allow to exotherm and cool. Separate the part from the mold and trim to size.

B. INSTALLATION

- 1) Sand the tank step area to be covered with non-skid grating using 40 grit paper on a D. A. Sander.
- 2) Apply a heavy brush coat of hot Derakane 8084 resin containing UV inhibitor, pigment and parrifinated styrene.
- 3) While the resin is wet, immediately press the grating firmly into the surface and hold in place until the resin hardens.

INSPECTION

It is the purpose of the inspection to verify that each part has been fabricated in accordance with and meets the requirements of this specification.

RESPONSIBILITIES: It is the responsibility of the fabricator to make available to ERA Helicopter or his authorized representative any or all of the following:

Records: Records pertaining to the part(s) being purchased shall be supplied when requested. These may include:

- Materials specifications
- Equipment drawings or mold jig
- Materials test results.
- Dimensional verification reports.
- Rework and repair reports.

MATERIALS:

Raw materials used for laminates shall be virgin materials and shall be free of contaminants as described on Pgs. 10 and 11.

FABRICATED PARTS: The part to be inspected shall be properly located and positioned, and shall be in condition to permit safe and thorough inspection. Reasonable means shall be provided to permit the inspector to visually examine the entire outer surfaces of the part.

Allowable defects are as shown on Pgs. 8 and 9.

The following inspection tools and equipment should be made available for use by the inspector.

- Barcol hardness tester.
- Acetone squeeze bottle with acetone.
- Extension cord with ground fault switch.
- A vapor tight inspection light.
- Thickness gauge.

INSPECTION

TEST OF FINISHED
PARTS:

The following basic tests shall be included as a minimum in the Acceptance Inspection.

Barcol Hardness Test - A test of resin cure shall be made in accordance with ASTM D2583. Take 10 readings, throw out highest and lowest, average the rest. Minimum acceptable average reading is 30.

Surface Cure Test - An acetone test shall be used to detect surface inhibition on surfaces exposed to air during cure. The procedure that should be used is the following: rub a few drops of acetone on the surface and check for tackiness after the acetone has evaporated. Persistent tackiness indicates incomplete cure.

Dimensions - The inspector shall be provided with copies of all approved drawings or mold jigs.

OTHER APPLICABLE DOCUMENTS:

ASTM Standards

C 581-74-Test Method for Chemical Resistance of Thermosetting Resins Used in Glass Fiber Reinforced Structures.

D 638-77a-Test method for Tensile Properties of Plastics.

D 790-71-Test Methods for Flexural Properties of Plastics and Electrical Insulating Materials.

D 883-78a-Definitions of Terms Relating to Plastics.

D 2583-75-Test Method for Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor.

ALLOWABLE DEFECTS

Defect	Surface inspected
	Nonprocess Side
Cracks(through part)	None
Crazing (fine surface cracks)	Max dimension 1/2 in., max density 5 per sq. ft. min 2 in apart
Blisters(rounded elevations of the laminate surface over bubbles)	Max 1/4 in., dia x 1/8 in. high, max 1 per sq ft, min 2 in apart
Wrinkles and solid blisters	Max deviation, 20% of wall thickness but not exceeding 1/8 in.
Pits(craters in the laminate surface)	Max dimensions, 1/8 in dia x 1/16 in deep, max density 10 per sq. ft.
Surface porosity(pin- holes or pores in the laminate)	Max dimensions, 1/8" dia. x 1/16" deep. Max. density 10 per sq. ft.
Chips	Max dimension of break, 1/4 in, and thickness no greater than 20 percent of wall thickness, max density 1 per sq ft
Dry spot(nonwetted reinforcing)	Max dimension, 2 sq in. per sq ft
Entrapped air (bubbles or voids in the laminate)	1/8 in. max dia, 4 per sq in. max density; 1/16 in. max dia. 10 per sq in. max density

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ALLOWABLE DEFECTS

Defect	Surface inspected
	Nonprocess Side
Exposed Glass	None
Burned Areas	None
Exposure of cut edges	None
Scratches	Max length 1 in. max depth 0.010 in.
Foreign Matter	1/16 in.dia, max density 1 per sq ft

KEVLAR WOVEN ROVING

1.0 Scope

1.1 The scope of these procedures is to describe the visual, physical and mechanical parameters which characterize kevlar woven roving used by the fabricator.

2.0 Definitions

2.1 Kevlar Woven Roving - Kevlar fiber rovings woven into a heavy weight fabric.

2.2 Wrap Ends - The rovings which run in the longitudinal direction of the fabric, i.e., along the roll length of the fabric.

2.3 Fill Picks - The rovings which run in the transverse direction of the fabric, i.e., across the roll length of the fabric.

2.4 Leno Strands - A pair of warp ends at each edge of the woven fabric. One Leno warp end is always over each fill pick while the other Leno warp end is always under the fill pick. The Leno strands define the edges of the woven field and serve to stabilize the edges of the fabric.

3.0 Requirements

3.1 Visual Requirements

3.1.1 Dirt Spots - Defined as all foreign matter, dirt, grease spots, etc. - The average number of dirt spots (1/16" to 3/4" in diameter) per 100 lineal feet shall be 6 or less. All rolls shall be free of dirt spots in excess of 3/4" diameter.

3.1.2 Warp Ends - All rolls shall be free of missing warp ends for more than two consecutive feet.

3.1.3 Fill Picks - All rolls shall be free of consecutive missing picks in excess of five, or more than eleven missing picks, either individual picks or any combination of individual and multiple (2, 3, 4, or 5) picks, in any consecutive 100 lineal feet.

3.1.4 Fuzz Clumps and Loops - The product is designed to exhibit proper laydown and shall be free of fuzz clumps or loops exceeding one inch in height from the surface.

KEVLAR WOVEN ROVING

3.2 Physical Properties

3.2.1 Thickness - The thickness of the mat in each roll of kevlar woven roving shall be measured.

3.3 Packaging Requirement - Packaging shall be visually inspected to assure proper labeling and that the package is free from damage that may render the kevlar woven roving unusable.

3.3.1 The kevlar woven roving shall be packaged in an unbroken carton as shipped from the manufacturer's factory. The kevlar woven roving used shall not be repackaged in the distribution of the kevlar woven roving after the manufacturer has shipped the kevlar woven roving.

3.4 Documentation - It is the responsibility of the fabricator to maintain records showing the results of all material testing. This information shall show at a minimum, the following:

- (a) Form of material
- (b) Manufacturer
- (c) Manufacturer's product description including binder type (treatment)
- (d) Manufacturer's product code
- (e) Production date, if available, or production code on carton.
- (f) Property measured and value recorded

- * Visual inspection
- * Width
- * Thickness
- * Packaging

- (g) Job number (Internal Fabricator Control Number)
- (h) Fabricated part identification number